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longer period in consequence before explosive conditions are again reached.

With the kind assistance of Professor L. S. Marks, the writer has attempted to determine the next date when Pelée is likely to erupt violently. Lacroix's latest observations, of November 4, indicate that the volcano is still intensely active, and this suggests that the *final* culmination did not come in August, as was the case with Krakatoa. An examination of the intervals and their differences shows that no simple arithmetical law will serve for the progression shown. A graphical solution may be obtained by plating a curve for the known intervals and extending this curve to cover the next interval. Professor Marks used this method; the extension of a smooth curve through the dates from May 8 to August 30 inclusive indicates that the next interval is about 112 days, if the same law holds. There is no simple analytical solution of the curve.

This would give December 20 or thereabouts as the date of the next great eruption of Mont Pelée. A French astronomer has predicted an eruption December 16,* because at that time the moon will be full, and when over Martinique will be at that point in her orbit nearest to the earth, and hence the lunar pull will be at a maximum with reference to any possible local instability in the earth's outer rock-film. It has been suggested that earlier eruptions were in singular coincidence with moon phases.

So far as prediction is possible, therefore, on the basis of such insufficient data, two lines of reasoning suggest mid-December as a time when a great eruption of Mont Pelée is likely to occur.

T. A. JAGGAR, JR.

HARVARD UNIVERSITY,
November 18, 1902.

SHORTER ARTICLES.

THE ETHNOLOGICAL SIGNIFICANCE OF ESOTERIC DOCTRINES.

IN recent years the study of the esoteric teachings found in American tribal society has become one of the favorite subjects of research of ethnologists. The symbolic sig-

* *L'Opinion*, Fort de France, Martinique, October 21, 1902.

nificance of complex rites, and the philosophic views of nature which they reveal, have come to us as a surprise, suggesting a higher development of Indian culture than is ordinarily assumed. The study of these doctrines conveys the impression that the reasoning of the Indian is profound, his emotions deep, his ethical ideals of a high quality.

It seems worth while to consider briefly the conditions under which these esoteric doctrines may have developed. Two theories regarding their origin suggest themselves: the esoteric doctrine may have originated among a select social group, and the exoteric doctrine may represent that part of it that leaked out and became known, or was made known, to the rest of the community; but it may also be that the esoteric doctrine developed among a select social group from the current beliefs of the tribe.

It seems to my mind that the second theory is the more plausible one, principally for the reason that the contents of the teachings among different tribes are often alike, no matter how much the systems may differ. Almost all the rituals that are the outward expression of esoteric doctrines appear to be old, and many have probably existed, almost in their present form, for considerable periods. Nevertheless, there is ample evidence of frequent borrowing and changes of sacred rites. Examples are the Sun Dance, various forms of the Ghost Dance, and the Mescal ceremonials. Miss Fletcher has called attention to the fact that Pawnee rituals have influenced the development of the rites of many tribes of the Plains. I might add similar examples from the Pacific coast, such as the transmission of Kwakiutl rituals to neighboring tribes.

There is also abundant proof showing that the mythologies of all tribes, notwithstanding the sacredness of some of the myths, contain many elements that can be proved to be of foreign origin. It seems very likely that similar conditions prevailed in the past, because the wide distribution of many cultural features can be understood only as the effect of a long-continued process of borrowing and dissemination.

Since the esoteric teaching refers to the

rituals, and is often largely based on mythological conceptions, it seems plausible that it should have developed as a more or less conscious attempt at systematizing the heterogeneous mass of beliefs and practices current in the tribe. Whenever a certain ceremonial came to be placed in charge of a small social group, were they chiefs, priests or simply men of influence, the conditions must have been favorable for the development of an esoteric doctrine. The thoughts of the men charged with the keeping of sacred rites must have dwelt on philosophical or religious questions, and it would seem natural that in the succession of generations the sacredness of the rite grew, and its philosophic significance increased in depth.

If this view is correct, the esoteric doctrine must have been evolved on the foundation of the general culture of the tribe, and must be considered as a secondary phenomenon the character of which depends upon the exoteric doctrine.

The opposite view, that the exoteric doctrine is a degenerate form of esoteric teaching, does not seem to me equally plausible, because it presupposes a highly complex system of actions and opinions originating spontaneously in a selected group of individuals. It is difficult to conceive how, in tribal society, conditions could have prevailed that would make such a development possible. This theory would seem to presuppose the occurrence of a general decay of culture. There is no reason that compels us to assume that such a decay has taken place, although it may have occurred in exceptional cases. If, on the other hand, we assume that the esoteric doctrine developed from popular beliefs, we do not need to assume any cultural conditions materially different from those found at the present time. It is quite evident that the esoteric doctrine, after it was once established, influenced, in its turn, popular belief, and that, therefore, there is a mutual and probably inextricable interrelation between the two doctrines.

If these considerations are correct, then the esoteric doctrine must, to a great extent, be considered as the product of individual

thought. It expresses the reaction of the best minds in the community upon the general cultural environment. It is their attempt to systematize the knowledge that underlies the culture of the community. In other words, this doctrine must be treated like any other system of philosophy, and its study has the same aims as the study of the history of philosophy.

Two characteristics of esoteric doctrine are quite striking. The first is that at the bottom of each doctrine there seems to be a certain line of thought which is applied to the whole domain of knowledge, and which gives the whole doctrine its essential character. This line of thought depends upon the general character of the culture of the tribe, but nevertheless has a high degree of individuality in each tribe. The theory of the universe seems to be based on its schematic application. The second characteristic is that, notwithstanding this systematization of knowledge, there remain many ideas that are not coordinated with the general system, and that may be quite out of accord with it. In such cases the contradiction between the general scheme and special ideas often escapes entirely the notice of the native philosophers. This phenomenon is quite analogous to the well-known characteristics of philosophic systems which bear the stamp of the thought of their time. The philosopher does not analyze each and every conclusion, but unconsciously adopts much of the current thought of his environment ready-made.

The theories regarding the origin of esoteric doctrine may be proved or disproved by a careful study of its relations to popular beliefs and to esoteric doctrines found among neighboring tribes. It is evident that the material needed for the solution of the problem includes both the esoteric teaching and the popular forms of belief.

What has been said before shows that, to the ethnologist, the problem of the genesis of exotery is of no less importance than that of esotery. However we may consider the origin of the latter, it must be admitted that it is the expression of thought of the exceptional mind. It is not the expression of thought

of the masses. Ethnology, however, does not deal with the exceptional man; it deals with the masses, and with the characteristic forms of their thoughts. The extremes of the forms of thought of the most highly developed and of the lowest mind in the community are of interest only as special varieties, and in so far as they influence the further development of the thought of the people. It may, therefore, be said that the exoteric doctrine is the more general ethnic phenomenon, the investigation of which is a necessary foundation for the study of the problems of esoteric teaching.

It is, therefore, evident that we must not, in our study of Indian life, seek for the highest form of thought only, which is held by the priest, the chief, the leader. Interesting and attractive as this field of research may be, it is supplementary only to the study of the thoughts, emotional life, and ethical standards of the common people, whose interests center in other fields of thought and of whom the select class forms only a special type.

It has taken many years for the study of the culture of civilized peoples to broaden out so as to take in not only the activities of the great, but also the homely life of the masses. The appreciation of the fact that the actions of each individual have their roots in the society in which he lives, has developed only recently, and has led to the intensive study of folk-lore and folk-customs that is characteristic of our times. It seems peculiar that, with increasing knowledge of the more complex forms of Indian culture, we seem to be losing interest in the popular belief; that we look for the true inward significance of customs among the select few, and become inclined to consider as superficial the study of the simpler and cruder ideas and ideals of the common folk. If it is true that for a full understanding of civilized society the knowledge of the popular mind is a necessity, it is doubly true in more primitive forms of society, where the isolation of social groups is very slight, and where each and every individual is connected by a thousand ties with the majority of the members of the tribe to which he belongs.

Far be it from me to deprecate the importance of studies of the philosophies developed by the Indian mind. Only let us not lose sight of their intimate relation to the popular beliefs, of the necessity of studying the two in connection with each other, and of the error that we should commit if we should consider the esoteric doctrine, and the whole system of thought and of ethical ideals which it represents, as the only true form of the inner life of the Indian.

FRANZ BOAS.

*THE ROYAL SOCIETY'S CATALOGUE OF
SCIENTIFIC PAPERS.*

THE following memorandum has been issued by the treasurer of the Royal Society:

The Royal Society has been engaged continuously during the past forty years in cataloguing the various scientific papers which have been issued in all parts of the world since the beginning of the last century. The original scheme of the 'Catalogue of Scientific Papers' provided that the papers should be catalogued only under the names of their respective authors, arranged alphabetically. This 'Authors' Catalogue' has now been carried down to the end of 1883, and comprises twelve quarto volumes.

More recently it has been decided to prepare also a subject index of the same papers—that is to say, a catalogue in which the papers are indexed according to the subject-matter of which they treat. Considerable progress has been made with this subject index, though nothing has as yet been published.

The expense of this work has been very large, since, although a great amount of gratuitous labor has been readily given by fellows of the society, it has been necessary to employ a considerable permanent salaried staff upon the preparation of the copy for the press. At first the printing and publication were undertaken by H.M. Stationery Office, the treasury having determined that the catalogue should be printed at the public expense. In coming to this conclusion the Lords of the Treasury stated that they had regard 'to the importance of the work with reference to the promotion of scientific knowledge generally,